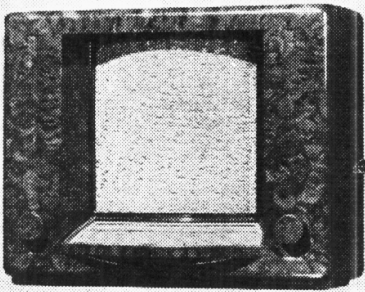


'TRADER' SERVICE SHEET

326

PHILIPS V7U

3-BAND AC/DC SUPERHET



THE Philips V7U is a 4-valve (plus rectifier) AC/DC 3-band superhet with a short-wave range of 16.7-51 m and suitable for mains of 200-260 V (40-100 C/S in the case of AC).

An outstanding feature is the unconventional form of construction used in that the components are mounted direct on to the cabinet, instead of on a chassis.

CIRCUIT DESCRIPTION

Aerial input on MW and LW via isolating condenser **C1**, coupling coils **L2, L3** and coupling condenser **C4**, to mixed coupled band-pass filter. Primary coils **L4, L5** are tuned by **C30**; secondaries **L10, L11** by **C32**; coupling by condensers **C6, C7** and coils **L6, L7**. IF filtering by **L1, C3** across coupling coils. Image suppression by **C5**. On SW, input is via **C1** and coupling coil **L8** to single-tuned circuit **L9, C32**. **R1** across aerial circuit provides a DC path between sockets **A** and **E** so that **C1** cannot develop a charge.

First valve (**V1**, Mullard metallised **FC13C**) is an octode operating as frequency changer with electron coupling. Oscillator grid coils **L12** (SW), **L13** (MW) and **L14** (LW) are tuned by **C33**; parallel trimming by **C34** (LW); series tracking by **C14** (MW) and **C13** (LW). Reaction by coils **L15** (SW), **L16** (MW) and **L17** (LW).

Second valve (**V2**, Mullard metallised **VP13C**) is a variable-mu RF pentode operating as intermediate frequency amplifier with tuned-primary tuned-secondary transformer couplings **C35, C11, L18, L19, C12, C36** and **C17, L20, L21, C18**.

Intermediate frequency 128 KC/S.

Diode second detector is part of double diode triode valve (**V3**, Mullard metallised **TDD13C**). Audio frequency component in rectified output is developed across load resistance **R7** and manual volume control **R8**, which also forms part of the load, and passed via fixed tone corrector **C20**, AF coupling condenser **C21** and CG resistance **R9** to CG of triode section, which operates as AF amplifier.

Second diode of **V3**, fed from **V2** anode via **C22**, provides DC potential which is developed across load resistance **R13** and fed back through decoupling circuit as GB to FC and IF valves, giving automatic volume control. Delay voltage, together with GB potential for triode section, is obtained from drop along **R17** in HT negative lead to chassis.

Resistance-capacity coupling by **R11, C24, R14** between **V3** triode and pentode output valve (**V4**, Mullard Pen36C).

Two position tone control in anode circuit by **S14, C26**. Metal grill frame, speaker frame and one side of speaker speech coil **L23**, are connected to socket **E**.

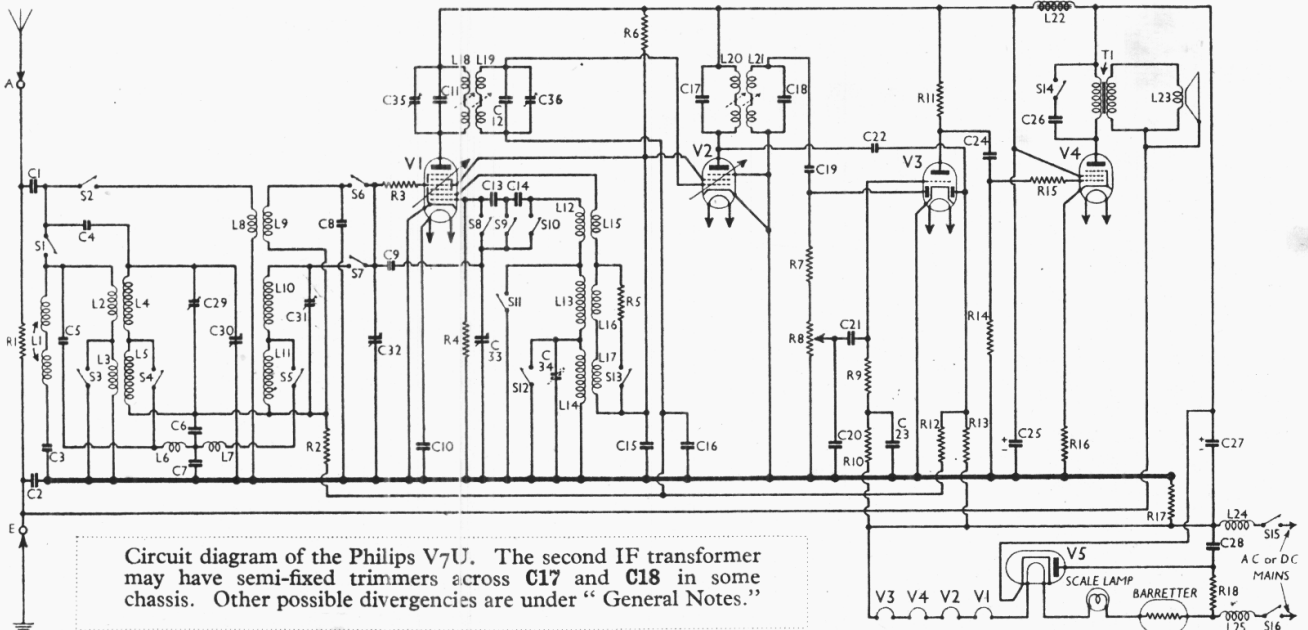
When the receiver is used with AC mains, HT current is supplied by IHC half-wave rectifying valve (**V5**, Philips **CY1C**) which, on DC mains, behaves as a low resistance. Smoothing is effected by iron-cored choke **L22** and large capacity wet electrolytic condensers **C25, C27**. RF filtering in rectifier anode circuit by **C28**.

Valve heaters are connected in series, together with scale lamp and current regulating barretter (Philips **C1**), across mains input. Filter chokes **L24, L25** suppress mains-borne interference.

COMPONENTS AND VALUES

RESISTANCES		Values (ohms)
R1	Aerial circuit safety shunt ..	100,000
R2	V1 pentode CG decoupling ..	100,000
R3	V1 pentode grid stabiliser ..	50
R4	V1 osc. CG resistance ..	50,000
R5	Osc. circuit SW stabiliser ..	40
R6	V1, V2 SG's and V1 osc. anode HT feed (approx.) ..	19,500*
R7	Part V3 signal diode load ..	200,000
R8	Manual volume control; part V3 signal diode load ..	500,000
R9	V3 triode CG resistance ..	800,000
R10	V3 triode CG decoupling ..	250,000
R11	V3 triode anode load ..	320,000
R12	AVC line decoupling ..	1,000,000
R13	V3 AVC diode load ..	500,000
R14	V4 CG resistance ..	800,000
R15	V4 grid stopper ..	200,000
R16	V4 GB resistance ..	180
R17	V3 triode GB and AVC delay (approx.) ..	30†
R18	V5 anode current limiter ..	125

* Two 64,000 O and one 50,000 O in parallel.
† One 125 O and one 40 O in parallel.



Circuit diagram of the Philips V7U. The second IF transformer may have semi-fixed trimmers across **C17** and **C18** in some chassis. Other possible divergencies are under "General Notes."

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PHILIPS V7U—Continued

maximum, but there was no signal input.

Voltages were measured on the 400 V scale of a model 7 Universal Avometer, the can of C25, one of the electrolytic smoothing condensers, being negative.

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V ₁ FC13C	240 97	3.0 2.2	97	4.1
V ₂ VP13C	240	2.4		
V ₃ TDD13C	36	0.7	97	1.1
V ₄ Pen36C	235	44.0	240	3.2
V ₅ CY1C†	—	—	—	—

† Cathode to chassis, 245 V DC.

GENERAL NOTES

Switches.—S1-S13 are the waveband switches, in two ganged rotary switches mounted on the left centre, looking at the rear of the cabinet. They are indicated by numbers in circles and arrows in the inside cabinet view, and are shown in detail in separate diagrams, where the units are seen looking from the right-hand side of the cabinet, with the cabinet face downwards. The table (col. 2) gives the switch positions for the three control settings, starting from fully anti-clockwise. A dash indicates open, and C closed.

S14 is the QMB tone control switch at the left-hand side of the cabinet (viewed from the front). It is closed when the lever knob is down.

S15, S16 are the two mains circuit switches, ganged with the volume control R8, and mounted between it and the front of the cabinet.

Coils.—L1 is in two sections on a tubular former, and is unscreened. L2-L5 and L8-L11 are in two tubular screened units. L6 and L7 are on another small tubular unscreened former, between the two screened units. The oscillator coils, L12-L17 are also unscreened, and are on a tubular former under the switch assembly.

The IF transformers L18, L19 and L20, L21 are to the top left and bottom right of the speaker. They are unscreened, and the primary and secondary in each case consists of two coils in series, whose relative position can be altered if alining becomes necessary.

External Speaker.—No provision is made for this, but a low impedance type could be connected across the internal speaker speech coil (L23).

Scale Lamp.—This is a special Philips MES type, with a frosted bulb, Part No. 8080. It can be removed and replaced more easily if its holder and mounting bracket are first twisted anti-clockwise through 90 degrees.

Resistances R6, R17.—R6 consists of two 64,000 and one 50,000 Ω resistor in parallel, giving an effective resistance of 19,500 Ω. R17 consists of a 125 Ω and a 40 Ω resistor in parallel, giving an effective resistance of 30 Ω approx.

Condenser C34.—This is a small condenser consisting of a spiral of insulated wire wound over a thick insulated wire.

Chassis Divergencies.—In our chassis

TABLE AND DIAGRAMS OF THE SWITCH UNITS

Switch	SW	MW	LW
S1	—	C	C
S2	C	—	—
S3	—	C	—
S4	—	C	—
S5	C	—	—
S6	C	—	—
S7	—	C	C
S8	—	—	C
S9	—	C	—
S10	C	—	—
S11	C	—	—
S12	—	C	—
S13	C	—	—

semi-fixed trimmers (C35, C36) are wired in parallel with the fixed trimmers (C11, C12) of the first IF transformer. The makers' diagram shows similar semi-fixed trimmers associated with the second IF transformer, but they are not included in our receiver.

In the makers' diagram, the screening grids of V1 and V2 are not common as in our set and diagram. Instead, there are two resistors in series between the HT line and the screen of V1 (6,400 and 9,600 Ω), while V2 screen goes to the junction of the two resistors, and has a separate 0.1 μF decoupling condenser. Incidentally, the second of the two resistors consists of a 6,400 and 3,200 Ω unit in series.

CIRCUIT ALIGNMENT

IF Stages.—Feed a 128 KC/S signal via a 0.032 μF condenser to the control grid of V2. Warm the outer coils of L20, L21 until the wax softens, by means of a soldering iron. First adjust the outer coil of L21, then the outer coil of L20, until maximum output is obtained. The coils should be moved along the former very slightly, taking care not to break the fine connecting wires.

Next apply the 128 KC/S signal via the 0.032 μF condenser to the control grid (top cap) to V1. In this case the wire-wound trimmers C35 and C36 must be adjusted by removing or adding turns until maximum output is secured in each case.

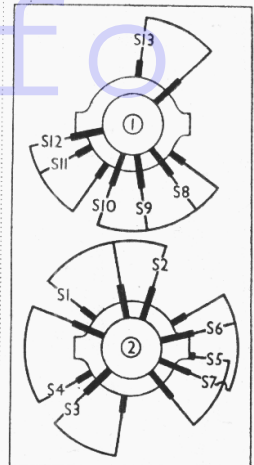
NOTE.—In some chassis L20 and L21 may also be provided with wire-wound trimmers, in which case these should be adjusted, and not the coils.

Feed the 128 KC/S signal to the A socket via a 0.0005 μF condenser, switch set to LW and turn the gang to 1,875 m. Heat L1, and adjust the spacing of the two coils until the minimum output is obtained.

RF and Oscillator Stages.—Switch set to MW. Rotate adjusting screw of C31 completely clockwise, and that of C29 about half-way. Feed a 1,450 KC/S (207 m) signal via a 0.0005 μF condenser to the A socket, and rotate the tuning condenser until the first signal from the minimum position becomes audible. Adjust the gang accurately for maximum output. Now adjust C29 and C31 for maximum output.

Without altering the tuning condenser setting, switch set to LW. Feed in a 411 KC/S (730 m) signal, and adjust C34 for maximum output. If the capacity is too high, unwind some of the spiralled wire; if it is too low, a new and longer piece of thin wire must be wound over the thicker wire.

Diagrams of the switches, as seen with the set lying face downwards, looking towards the units from the S14 end of the cabinet.



MAINTENANCE PROBLEMS

Vibration produces Hum

A PHILIPS 585U receiver was brought in with the complaint that a very loud mains hum occurred at times, usually, but not always, when the set was first switched on. The fault, it appeared, had existed since the set was new, but although various attempts had been made to effect a cure, including the fitting of new valves, no improvement had resulted.

As so frequently happens, the set was switched on and off time and time again, but the noise did not occur once until the cabinet was drastically thumped. After this it was easy to get the noise as one wished, and after all kinds of tests it was concluded that a vibration was the probable cause. This led, of course, to trial and error testing, and ultimately the trouble was traced to the cover of the tuning condenser. This was wedged with a small piece of wood, and the set has been quite satisfactory since.

A possible explanation of the reduced tendency of the noise to occur in different circumstances is that environment may have had something to do with it. The nature of the noise together with the fact that it most usually occurred when the set was first switched on suggested that the condenser cover's resonant frequency was the same as that of the AC mains.—J. T. HARVEY, CAMBRIDGE.

Re-Soldering Valve Top Caps

I HAD in for service recently an Ekco and a Mullard receiver. Both had the same fault, bad crackling after they had been switched on for a few minutes.

On changing the FC4 valves the trouble was put right. I unsoldered the top caps of the valves, and found dry joints, the cause being that when the valve caps were originally soldered up, air locks were formed.

To prevent this, a small hole should be drilled in the side of the top cap before re-soldering.—A. S. WATFORD, WINDSOR.